

CA-NV AWWA Water Loss Technical Assistance Program Wave 4 Water Audit Level 1 Validation Document

Audit Information:

Utility: Arvin Community Services District **PWS ID:** 1510001
System Type: Potable **Audit Period:** Calendar 2016
Utility Representation: Raul Barraza
Validation Date: 9/29/2017 **Call Time:** 830a **Sufficient Supporting Documents Provided:** Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 59 **Data Validity Band (Level):** Band III (51-70)
ILI: 5.78 **Real Loss:** 81.05 (gal/conn/day) **Apparent Loss:** 15.06 (gal/conn/day)
Non-revenue water as percent of cost of operating system: 8.4%

Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

Validator Information:

Water Audit Validator: Will Jernigan **Validator Qualifications:** Contractor for CA-NV AWWA Water Loss TAP

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#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
1	Volume from Own Sources	VOS	5	<p>Supply meter profile: 7 active wells. Individually metered. No SCADA system in place. 3 of the meters are magnetic type.</p> <p>VOS input derived from: Manual reads from production meters as archived.</p> <p>Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.</p>	<p>Percent of own supply metered: 100%</p> <p>Signal calibration frequency: None.</p> <p>Volumetric testing frequency: Annual, began in late 2016.</p> <p>Volumetric testing method: Transit-time ultrasonic.</p> <p>Percent of own supply tested: 100%</p> <p>Comments: Limiting criteria for DVG is availability of testing/calibration documentation.</p>
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	<p>Input derivation: Left blank in absence of available test data.</p> <p>Net storage change included in MMSEA input: No.</p> <p>Comments: No additional comments.</p>	<p>Supply meter read frequency: Daily.</p> <p>Supply meter read method: Manual.</p> <p>Frequency of data review for trends & anomalies: Each business day.</p> <p>Storage levels monitored in real-time: No.</p> <p>Comments: Net storage change as limiting criteria for DVG.</p>
3	Water Imported	WI	n/a		
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	n/a		
5	Water Exported	WE	n/a		
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	n/a		
7	Billed metered	BMAC	7	<p>Customer meter profile:</p> <p>Age profile: Up to 15-20 years.</p> <p>Reading system: 60% touch, 40% AMR.</p> <p>Read frequency: Monthly.</p> <p>Comments: Lag-time correction is not employed in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.</p>	<p>Percent of customers metered: 100%</p> <p>Small meter testing policy: Reactive testing plus limited sampling – 25 meters from oldest part of system in audit year.</p> <p>Number of small meters tested/year: 25</p> <p>Large meter testing policy: Reactive - complaint based or flagged-consumption testing only.</p> <p>Number of large meters tested/year: Not quantified, but known to be small.</p> <p>Meter replacement policy: Part of AMR conversion, targeted for completion within 3 years.</p>

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
					<p>Number of replacements/year: ~10%.</p> <p>Billing data auditing: Standard billing QC, plus review of volumes by use type each billing cycle.</p> <p>Comments: No additional comments.</p>
8	Billed unmetered	BUAC	n/a		
9	Unbilled metered	UMAC	n/a		
10	Unbilled unmetered	UUAC	5	<p>Profile: Operational flushing and fire department usage.</p> <p>Comments: Flushing activities greatly scaled back due to drought. Custom California default of 0.25% x WWS utilized.</p>	Comments: Default grade applied.
11	Unauthorized consumption	UC	5	Comments: Default input applied.	Comments: Default grade applied.
12	Customer metering inaccuracies	CMI	3	<p>See BMAC comments regarding meter testing & replacement activities.</p> <p>Input derivation: Rudimentary estimate.</p> <p>Comments: No additional comments.</p>	<p>Characterization of meter testing: Routine (proactive), but very limited.</p> <p>Characterization of meter replacement: Routine (proactive), but limited.</p> <p>Comments: No additional comments.</p>
13	Systematic data handling errors	SDHE	5	Comments: Default input applied.	Comments: Default grade applied.
14	Length of mains	Lm	5	<p>Input derivation: Extracted from paper-based mapping.</p> <p>Hydrant leads included: Yes.</p> <p>Comments: No additional comments.</p>	<p>Mapping format: Paper.</p> <p>Asset management database: Not currently in place.</p> <p>Map updates & field validation: Primarily driven by system expansion.</p> <p>Comments: No additional comments.</p>
15	Number of service connections	Ns	8	<p>Input derivation: Standard report run from billing system.</p> <p>Basis for database query: Location or other premise-based ID.</p> <p>Comments: No additional comments.</p>	<p>CIS updates & field validation: Accomplished through normal meter reading processes.</p> <p>Estimated error of total count within: 2%.</p> <p>Comments: No additional comments.</p>
16	Ave length of cust. service line	Lp	10	Comments: Default input and grade applied, as customer meters are typically located at the property boundary given California climate.	

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
17	Average operating pressure	AOP	3	<p>Number of zones, general profile: 1 zone, mild terrain (50 feet relief). Typical pressure range: 45-85 Input derivation: Inferred from observations of pressure readings in field or review of pressure measurements. Comments: No additional comments.</p>	<p>Extent of static pressure data collection: Hydrant pressures taken during routine system flushing and/or hydrant testing. Characterization of real-time pressure data collection: No real-time monitoring currently in place. Hydraulic model: None currently in place. Comments: No real-time data logging as limiting criteria for DVG.</p>
18	Total annual operating cost	TAOC	10	<p>Input derivation: From official financial reports. Comments: Confirmed costs limited to water only, and water debt service included.</p>	<p>Frequency of internal auditing: Annually. Frequency of third-party CPA auditing: Annually. Comments: No additional comments.</p>
19	Customer retail unit cost	CRUC	10	<p>Input derivation: Simple rate structure with only a single volumetric rate. Sewer charges are not applicable. Comments: No additional comments.</p>	<p>Characterization of calculation: Composite via simple rate structure with only a single rate. Input calculations have been reviewed by an M36 water loss expert. Comments: No additional comments.</p>
20	Variable production cost	VPC	4	<p>Supply profile: Own sources only. Primary costs included: Treatment chemicals and supply & distribution power. Secondary costs included: None currently included. Comments: Power & chemical costs for audit year at \$1,166,008.</p>	<p>Characterization of calculation: Primary costs only. Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.</p>

Key Audit Metrics

(~)	VALIDITY	Data Validity Score: 59	Data Validity Band (Level): Band III (51-70)	
(#)	VOLUME	ILI: 5.78	Apparent Loss: 15.06 (gal/conn/day)	Real Loss: 81.05 (gal/conn/day)
(\$)	VALUE		Annual Cost of Apparent Losses: \$32,466	Annual Cost of Real Losses: \$162,619

Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Original in late 1950s, rapid growth in 2000s. ~20-30 years average.

Infrastructure replacement policy (current, historic): Mostly reactive repairs historically, next priority in CIP is valve replacements.

Estimated main failures/year: 2 in 2016 – both 12". Estimated service failures/year: 180-200

Extent of proactive leakage management: CA RWA has done some limited survey work.

Other water loss management comments: No additional comments.

Comments on Audit Metrics & Validity Improvements

The Infrastructure Leakage Index (ILI) of 5.78 describes a system that experiences leakage at 5.78 times the modeled technical minimum for its system characteristics. The Data Validity Score falling within Band III (51-70) suggests that next steps may be focused simultaneously on improving data reliability and evaluating cost-effective interventions for water & revenue loss recovery. Opportunities to improve the reliability of audit inputs and outputs include:

- Improved understanding of Supply Meter (Own or Import) Master Meter Error: consider adopting or increasing the rigor of a source meter volumetric testing and calibration program, informed by the guidance provided in AWWA Manual M36 – Appendix A.
- Customized estimate of Unbilled Unmetered Authorized Consumption: consider producing itemized, agency-specific estimates of unbilled unmetered (operational) uses, rather than using the default. Ensure leakage estimates are excluded.
- Improved estimation of CMI: consider a customer meter testing program which tests a sample of random meters whose stratification (by size, age, or other characteristics) represents the entire customer meter stock.

When the CA-NV AWWA Water Audit Validator (WAV) program comes online after this year, is the utility planning on having a staff member become certified to perform the Level 1 Validation for future audits? Not likely, given staff size.



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Water System ID Number: 1510001

Water Audit Period: Calendar 2016

Water Audit & Water Loss Improvement Steps:

Steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

District just adopted new Capital Improvement Plan which contains plans for water meter replacement and main line replacement scheduled for the next ten years.

Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Utility Provided

Paul Barva, Jr

Executive Name (Print)

General Manager

Executive Position

[Signature]

Signature

10/3/2017

Date